

## CLAIMS

What is claimed is:

1. A roadside-to-vehicle communication system for providing mobile stations with diverse application services, by utilizing  
5 roadside-to-vehicle communication implemented between mobile stations that travel on a road and a base station system installed along the road, the roadside-to-vehicle communication system comprising:

transfer service processing entities for providing means to  
10 implement data transfer among a plurality of applications; and

transaction management entities for providing unidirectional data transmission and request-response-type transaction services, the transaction management entity comprising:

15 undelivered data resending means;  
data sending/receiving means for each of messages;  
and  
message segmenting/assembling means.

20 2. The roadside-to-vehicle communication system according to claim 1, wherein the transfer service processing entity utilizes port numbers in order to identify the plurality of applications.

3. The roadside-to-vehicle communication system according to  
25 claim 2, wherein a reservation port that is globally unique and an

arbitrary port that is locally unique are utilized as the port numbers for identifying applications.

4. The roadside-to-vehicle communication system according to claim 1, wherein the transfer service processing entity notifies an application of the status of establishing wireless communication.

5. The roadside-to-vehicle communication system according to claim 3, wherein, upon initial setup, the transfer service processing entity notifies an opposite station of port numbers for identifying applications of the station to which the transfer service processing entity belongs.

6. The roadside-to-vehicle communication system according to claim 5, wherein the transfer service processing entity and the transaction management entity enable an initial setup procedure to be omitted.

7. The roadside-to-vehicle communication system according to claim 2, wherein, when the transfer service processing entity receives a message from an opposite station and when no application for a transmission destination exists in the station to which the transfer service processing entity belongs, the transfer service processing entity immediately notifies of the opposite station of the fact.

8. The roadside-to-vehicle communication system according to claim 1, wherein, in order to identify units of a transaction, the transaction management entity utilizes an identifier designated by an application.

9. The roadside-to-vehicle communication system according to claim 8, wherein the transaction management entity checks whether or not any duplicated transaction exists, by means of identifiers assigned to transactions.

10. The roadside-to-vehicle communication system according to claim 8, wherein the transaction management entity aborts transactions by means of identifiers assigned to transactions.

11. The roadside-to-vehicle communication system according to claim 8, wherein the transaction management entity of a sending station divides an original message into a plurality of data segments and adds to each of the segments one identifier and a sequential number for transaction identifying, and wherein the transaction management entity of a receiving station reassembles into the original message the data segments whose identifiers are identical to that one identifier, by determining an assembling order based on the sequential numbers.

12. The roadside-to-vehicle communication system according to claim 11, wherein, in implementing divided transmission, the transaction management entity controls duration between transmissions, depending on the status of a sending queue in a lower layer.

13. The roadside-to-vehicle communication system according to claim 11, wherein, when the transaction management entity of the receiving station receives the final data segment of the divided message, the transaction management entity of the receiving station notifies the transaction management entity of the sending station of the sequential number of undelivered data segments, and the transaction management entity of the sending station resends the undelivered data segments only.

14. The roadside-to-vehicle communication system according to claim 8, wherein, when the identifier, in a received data segment, for identifying units of a transaction is identical to the identifier of data segments that have been already received, the transaction management entity handles that received data segment as a data segment whose identifier is identical to that of the data segments that have been already received.

15. The roadside-to-vehicle communication system according to claim 11, wherein, when the identifier, in a received data segment,

for identifying units of a transaction is identical to the identifier of data segments that have been already received, the transaction management entity handles that received data segment as a data segment whose identifier is identical to that of the data segments  
5 that have been already received.

16. The roadside-to-vehicle communication system according to claim 11, wherein the transaction management entity has an area, for assembling divided segments into a message, designated by an  
10 application.

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